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June 12th, 2004

Administrator
US Environmental Protection Agency
P.O. Box 1473
Merrifield, VA 22116
Attention: Chemical Right-to-Know Program

Administrator:

ISOCHEM Inc. (formerly VanDeMark Inc.) is sponsoring as part of the HPV Challenge Program p-toluenesulfonyl isocyante; CAS number 4083-64-1.

As part of our commitment we are providing a test plan and robust summaries of existing data.

Our Technical contact is:

Wendy H. Koch, Ph.D.
Epona Associates, LLC
156 River Road, Studio 3
Willington, CT 06279
Telephone 860 4290038
Facsimile 860 4290151

I will serve as the company contact for this program.

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p-Toluenesulfonyl Isocyanate Background Information

CAS No. 4083-64-1

June 2004

Introduction

p-Toluenesulfonyl isocyanate (PTSI) is a highly reactive sulfonyl isocyanate. The reactivity of PTSI toward active hydrogen atoms makes it useful as a scavenger for water and other isocyanate reactive groups such as free acid in powdered aluminum alkanoates and active hydrogen present in carbon black pigments which cause polyurethane coatings, sealants and adhesives to thicken during storage. PTSI is recommended especially for one-component, low-VOC polyurethane coatings. The reaction of PTSI with water introduced from pigments and solvents in the paint formulation generates carbon dioxide and soluble inert chemical products. This highly reactive sulfonyl isocyanate is also used as an intermediate in the synthesis of other useful chemical compounds.

PTSI (Figure 1) reacts rapidly with excess water to form the corresponding carbamic acid, which in turn, undergoes immediate decomposition to form carbon dioxide and p-toluenesulfonamide (CAS number 70-55-3; Figure 2). p-Toluenesulfonamide has been tested. Some environmental fate and effects and mammalian toxicity data for p-toluenesulfonamide will be used to represent PTSI .

Background Information: Manufacturing and Commercial Applications

Manufacturing

PTSI is a member of the sulfonyl isocyanate class of chemicals. Sulfonyl isocyanates were first obtained by the reaction of arylsulfonyl chlorides with silver cyanate. The direct, high temperature phosgenation of p-toluenesulfonamide was first described by Krzikalla; an improved synthesis has been disclosed by Sayigh and Ulrich. The reactivity of the isocyanate carbon in PTSI is greatly enhanced by the adjacent sulfonyl group. The reaction of sulfonyl isocyanates with active hydrogen compounds is extremely rapid and requires no catalyst in contrast to alkyl and aryl isocyanates. PTSI does not dimerize, trimerize or form carbodiimides as do the alkyl and aryl isocyanates

PTSI is shipped in accordance with USA DOT regulations as Chemicals NOS, in 10, 50 and 500 pound drums.

Commercial Applications

PTSI (p-toluenesulfonyl isocyanate) is a low-viscosity reactive additive used as a water scavenger in the formulation of specialty urethane products, including adhesives, sealants and coatings. PTSI can be used

as a raw material in the synthesis of a number of commercially important pharmaceuticals of the oral hypoglycemic class, a variety of agricultural chemicals including herbicidal antidotes, have also been prepared using PTSI and other aromatic sulfonyl isocyanates. The wide variety of reactions possible with PTSI suggests additional applications in the synthesis of agricultural, veterinary, pharmaceutical and polymer products. PTSI is used widely as a stabilizer for organic isocyanates and as a water scavenger in the formulation of specialty urethane products.

Matrix of SIDS Endpoints

The summary of available and valid data for PTSI and p-toluenesulfonamide are provided in **Table 1**. **Appendix A** contains the Robust Summaries for PTSI and p-toluenesulfonamide.

Table 1: Matrix of Available and Adequate Data on PTSI

Test	PTSI CAS No. 4083-64-1	p-Toluenesulfonamide CAS number 70-55-3
Chemical/Physical Properties		
Melting Point	-2 deg C	NR
Vapor Pressure	1 mm Hg @ 100 deg C	NR
Boiling Point	144 deg C @ 10 mm Hg	NR
Partition Coefficient	NA*	.82
Water Solubility	1318 - mg/l at 25 °C (estimated)*	NR
Environmental Fate		
Hydrolysis	<10 minutes at 25 °C	NR
Photodegradation	~9 days	NR
Biodegradation	NA*	low biodegradability
Environmental Transport	Air 6.04% Water 31.3% Soil 62.5% Sediment 0.174%	NR
Aquatic Toxicity		
Acute Fish	NA*	60 d EC = 9 mg/l; 96-hr LC50 = 1314 mg/l (estimated)
Acute Daphnia	NA*	48-hr LC50 = 1307 mg/l (estimated)
Acute Algae	NA*	96-hr EC50 = 768 (estimated)
Mammalian Toxicity		
Acute Oral	LD50=2600 mg/kg	NR
Repeated Dose	NA*	NOEL = 120 mg/kg/d (rat)
Genotoxicity (*in vitro* -bacteria)	NA*	negative
Genotoxicity (*in vitro* - mammalian)	NA*	negative
Reproductive/Developmental	NA*	NOAEL F1 offspring = 300 mg/kg/d (rat); NOAEL teratogenicity = 300 mg/kg/d (rat)

NA = Not applicable due to chemical/physical properties
NR = Not required
* = PTSI reacts rapidly with water to form the corresponding carbamic acid, which in turn, undergoes immediate decomposition to form carbon dioxide and p-toluenesulfonamide (CAS number 70-55-3). PTSI is not likely to be found in the environment.

A description of the results of this evaluation follows.

- **Physicochemical Properties**

Melting point, boiling point and vapor pressure information are available for PTSI. Partition coefficient data for p-toluenesulfonamide have been provided; PTSI rapidly hydrolyses to form p-toluenesulfonamide. The water solubility of PTSI was estimated using EPIWIN; this modeling is not likely to be applicable as PTSI rapidly hydrolyzes in water.

Additional testing is not proposed.

- **Environmental Fate**

Rapid reaction with water would result in rapid disappearance from water and moist soil. The rate of hydrolysis has been determined to be less than 10 minutes at 25 deg C. This information confirms that PTSI is a hydrolytically unstable material and will immediately hydrolyze upon contact with water or water vapor. Consequently, biodegradation of PTSI is best represented by the biodegradation of p-tolunesulfonamide. This material has a low biodegradability. Photodegradation has been modeled using EPIWIN; the half-life of PTSI is about 9 days. The environmental fate of PTSI was evaluated using the EQC multimedia fugacity model (Level III). The results indicate PTSI will partition primarily to soil (~63%) and water (~31%). Modeling may not be appropriate as PTSI is not expected to be found in the environment due to its rapid hydrolysis.

Additional testing is not proposed.

- **Ecotoxicity**

There is no data available for PTSI; this material is not expected to be present in the environment due to rapid reaction in the presence of water or moisture. Based on the rapid hydrolysis of PTSI to p-toluenesulfonamide (and carbon dioxide), ecotoxicity is best described by the hydrolysis product. In a 60-day study with *Oncorhynchus mykiss*, p-toluenesulfonamide had an effect concentration (EC) of 9 mg/l. Predicted 96-hr and 48-hr LC50s for fish and daphnia, respectively, are greater than 1000 mg/l for p-toluenesulfonamide. No data were located regarding the toxicity of p-toluensulfonamide to algae; modeling indicates a 96-hr EC50 of 768 mg/l.

Additional testing is not proposed.

- **Health Effects**

The acute oral toxicity (LD50) of PTSI is 2600 mg/kg. Based on the rapid hydrolysis of PTSI to p-toluenesulfonamide (and carbon dioxide), repeated dose, reproductive, and developmental toxicity, as well as genotoxicity are best described by the hydrolysis product. In an OECD 422 (repeated dose toxicity with screening reproductive toxicity and developmental effects in rats), p-toluenesulfonamide had a systemic toxicity NOEL of 120 mg/kg. The NOAEL for F1 offspring was 300 mg/kg/d; the NOAEL for teratogenicity was 300 mg/kg/d. p-Toluenesulfonamide was negative for mutagenicity in both bacterial and mammalian in vitro test systems.

Additional testing is not proposed.

Table 2 presents the proposed test plan for PTSI. Based on the rapid hydrolysis of PTSI to carbon dioxide and p-toluenesulfonamide, no testing is proposed.

Table 2: p-Toluenesulfonyl Isocyanate Test Plan

Physical-Chemical				
Melting Point	**Boiling Point**	**Vapor Pressure**	**Partition Coefficient**	**Water Solubility**
A	A	A	R	Calc

Environmental Fate			
Photodegradation	**Stability in Water**	**Transport/ Distribution**	**Biodegradation**
Calc	A	Calc	R

Ecotoxicity		
Acute Toxicity to Fish	**Acute Toxicity to Aquatic Plants (e.g., Algae)**	**Acute Toxicity to Daphnia**
R	R	R

Mammalian Toxicity					
Acute Toxicity	**Bacterial Genetic Toxicity *In Vitro***	**Mammalian Genetic Toxicity *In Vitro***	**Repeat Dose Toxicity**	**Reproductive Toxicity**	**Developmental Toxicity**
A	R	R	R	R	R

Legend	
Symbol	**Description**
Calc	Endpoint requirement fulfilled based on calculated data (modeling)
A	Endpoint requirement fulfilled with adequate existing data
R	Other (endpoints fulfilled with data from hydrolysis product)

FIGURES

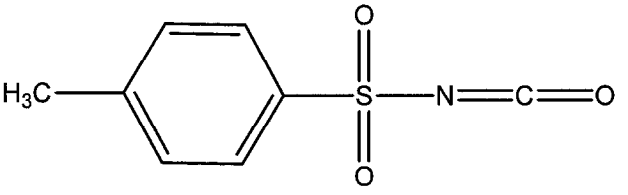

Figure 1 – Structure of PTSI

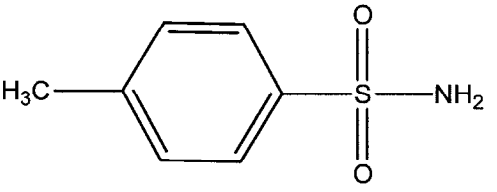

Figure 2 – Structure of p-Toluenesulfonamide

APPENDIX A

ROBUST SUMMARIES

I U C L I D

Data Set

Existing Chemical	:	ID: 4083-64-1
CAS No.	:	4083-64-1
EINECS Name	:	p-toluenesulphonyl isocyanate
EC No.	:	223-810-8
Molecular Formula	:	C8H7NO3S

Producer related part

Company	:	Epona Associates, LLC
Creation date	:	09.06.2003

Substance related part

Company	:	Epona Associates, LLC
Creation date	:	09.06.2003
Status	:	
Memo	:	ISOCHEM Inc.
Printing date	:	01.06.2004
Revision date	:	
Date of last update	:	01.06.2004
Number of pages	:	7
Chapter (profile)	:	Chapter: 2.1, 2.2, 2.4, 2.5, 2.6.1, 3.1.1, 3.1.2, 3.3.1, 3.5, 4.1, 4.2, 4.3, 5.1.1, 5.1.2, 5.1.3, 5.1.4, 5.4, 5.5, 5.6, 5.8.1, 5.8.2
Reliability (profile)	:	Reliability: without reliability, 1, 2, 3, 4
Flags (profile)	:	Flags: without flag, confidential, non confidential, WGK (DE), TA-Luft (DE), Material Safety Dataset, Risk Assessment, Directive 67/548/EEC, SIDS

2.1 MELTING POINT

Value	:	= -2 °C
Sublimation	:	
Method	:	
Year	:	2002
GLP	:	no data
Test substance	:	as prescribed by 1.1 - 1.4
Remark	:	Freezing Point
Source	:	Epona Associates, LLC
Reliability	:	(2) valid with restrictions
Flag	:	Critical study for SIDS endpoint

09.06.2003 (13)

2.2 BOILING POINT

Value	:	= 144 °C at 1333 hPa
Decomposition	:	
Method	:	
Year	:	2002
GLP	:	no data
Test substance	:	as prescribed by 1.1 - 1.4
Remark	:	Pressure 10 mm Hg
Source	:	Epona Associates, LLC
Reliability	:	(2) valid with restrictions
Flag	:	Critical study for SIDS endpoint

01.06.2004 (13)

2.4 VAPOUR PRESSURE

Value	:	= 1.33 hPa at 100 °C
Decomposition	:	
Method	:	
Year	:	2002
GLP	:	no data
Test substance	:	as prescribed by 1.1 - 1.4
Result	:	1 mm Hg @ 100 deg C
Source	:	Epona Associates, LLC
Reliability	:	(2) valid with restrictions
Flag	:	Critical study for SIDS endpoint

01.06.2004 (13)

2.5 PARTITION COEFFICIENT

Partition coefficient	:	octanol-water
Log pow	:	= .82 at °C
pH value	:	
Method	:	
Year	:	1979
GLP	:	no data
Test substance	:	other TS

Remark	:	PTSI reacts rapidly with excess water to form the corresponding carbamic acid, which in turn, undergoes immediate decomposition to form carbon dioxide and p-toluenesulfonamide (CAS number 70-55-3).
Source	:	Epona Associates, LLC
Test substance	:	CAS Registry Number: 70-55-3 Chemical Name: P-TOLUENESULFONAMIDE Synonyms: 4-METHYLBENZENESULFONAMIDE Molecular Formula: C7H9NO2S Molecular Weight: 171.22
Reliability	:	(2) valid with restrictions
Flag	:	Critical study for SIDS endpoint

02.04.2004 (4)

2.6.1 SOLUBILITY IN DIFFERENT MEDIA

Solubility in	:	Water
Value	:	= 1318 mg/l at 25 °C
pH value	:	
concentration	:	at °C
Temperature effects	:	
Examine different pol.	:	
pKa	:	at 25 °C
Description	:	
Stable	:	no
Deg. product	:	
Method	:	other: estimated
Year	:	2004
GLP	:	no
Test substance	:	as prescribed by 1.1 - 1.4
Deg. products	:	70-55-3 200-741-1 toluene-4-sulphonamide
Remark	:	PTSI reacts rapidly with excess water to form the corresponding carbamic acid, which in turn, undergoes immediate decomposition to form carbon dioxide and p-toluenesulfonamide (CAS number 70-55-3).
Result	:	WSKOW v1.41 Results Log Kow (estimated) : 2.34 Log Kow (experimental): not available from database Log Kow used by Water solubility estimates: 2.34 Equation Used to Make Water Sol estimate: Log S (mol/L) = 0.693-0.96 log Kow-0.0092(Tm-25)-0.00314 MW + Correction Melting Pt (Tm) = -2.00 deg C (Use Tm = 25 for all liquids) Correction(s): Value ---------- ----- No Applicable Correction Factors Log Water Solubility (in moles/L) : -2.175 Water Solubility at 25 deg C (mg/L): 1318
Source	:	Epona Associates, LLC
Test condition	:	log Kow used: 2.34 (estimated) no-melting pt equation used
Reliability	:	(2) valid with restrictions
Flag	:	Critical study for SIDS endpoint

02.04.2004 (7)

3.1.1 PHOTODEGRADATION

Type	:	air
Light source	:	
Light spectrum	:	nm
Relative intensity	:	based on intensity of sunlight
DIRECT PHOTOLYSIS		
Halflife t1/2	:	ca. 8.8 day(s)
Degradation	:	% after
Quantum yield	:	
INDIRECT PHOTOLYSIS		
Sensitizer	:	
Conc. of sensitizer	:	
Rate constant	:	= .00000000000122 cm^3/(molecule*sec)
Degradation	:	% after
Deg. product	:	not measured
Method	:	other (calculated)
Year	:	2004
GLP	:	no
Test substance	:	as prescribed by 1.1 - 1.4

Result :

SUMMARY (AOP v1.91): HYDROXYL RADICALS
Hydrogen Abstraction = 0.1360 E-12 cm3/molecule-sec
Reaction with N, S and -OH = 0.0000 E-12 cm3/molecule-sec
Addition to Triple Bonds = 0.0000 E-12 cm3/molecule-sec
Addition to Olefinic Bonds = 0.0000 E-12 cm3/molecule-sec
**Addition to Aromatic Rings = 1.0883 E-12 cm3/molecule-sec
Addition to Fused Rings = 0.0000 E-12 cm3/molecule-sec

OVERALL OH Rate Constant = 1.2243 E-12 cm3/molecule-sec
HALF-LIFE = 8.737 Days (12-hr day; 1.5E6 OH/cm3)
HALF-LIFE = 104.839 Hrs
** Designates Estimation(s) Using ASSUMED Value(s)

SUMMARY (AOP v1.91): OZONE REACTION

****** NO OZONE REACTION ESTIMATION ******
(ONLY Olefins and Acetylenes are Estimated)

Source	:	Epona Associates, LLC
Test substance	:	SMILES : O=C=NS(=O)(=O)c(ccc(c1)C)c1 CHEM : Benzenesulfonyl isocyanate, 4-methyl- MOL FOR: C8 H7 N1 O3 S1 MOL WT : 197.21
Reliability	:	(2) valid with restrictions
Flag	:	Critical study for SIDS endpoint

02.04.2004 (1)

3.1.2 STABILITY IN WATER

Type	:	abiotic
t1/2 pH4	:	< 10 minute(s) at 25 °C
t1/2 pH7	:	< 10 minute(s) at 25 °C
t1/2 pH9	:	< 10 minute(s) at 25 °C
Deg. product	:	
Method	:	other
Year	:	2004
GLP	:	no

Test substance : as prescribed by 1.1 - 1.4
Deg. products : 70-55-3 200-741-1 toluene-4-sulphonamide

Result : HYDROWIN Program (v1.67) Results:
==========
Compound has an ISOCYANATE group; C=O located at SMILES atom #: 2

***** CALCULATION NOT PERFORMED *****

Even at low pH, the hydrolysis rate is very fast: t1/2 < 10 minutes.

Source : Epona Associates, LLC
Test substance : SMILES : O=C=NS(=O)(=O)c(ccc(c1)C)c1
CHEM : Benzenesulfonyl isocyanate, 4-methyl-
MOL FOR: C8 H7 N1 O3 S1
MOL WT : 197.21
Reliability : (2) valid with restrictions
Flag : Critical study for SIDS endpoint
02.04.2004 (5)

3.3.1 TRANSPORT BETWEEN ENVIRONMENTAL COMPARTMENTS

Type : fugacity model level III
Media :
Air : % (Fugacity Model Level I)
Water : % (Fugacity Model Level I)
Soil : % (Fugacity Model Level I)
Biota : % (Fugacity Model Level II/III)
Soil : % (Fugacity Model Level II/III)
Method : other: estimated
Year : 2004

Remark : PTSI reacts rapidly with excess water to form the corresponding carbamic acid, which in turn, undergoes immediate decomposition to form carbon dioxide and p-toluenesulfonamide (CAS number 70-55-3). PTSI is not likely to be found in the environment.

Result : Level III Fugacity Model (Full-Output):
==========
Chem Name : Benzenesulfonyl isocyanate, 4-methyl-
Molecular Wt: 197.21
Henry's LC : 5.69e-005 atm-m3/mole (Henrywin program)
Vapor Press : 5.29 mm Hg (Mpbpwin program)
Log Kow : 2.34 (Kowwin program)
Soil Koc : 89.7 (calc by model)

	Mass Amount (percent)	Half-Life (hr)	Emissions (kg/hr)
Air	6.04	210	1000
Water	31.3	900	1000
Soil	62.5	900	1000
Sediment	0.174	3.6e+003	0

	Fugacity (atm)	Reaction (kg/hr)	Advection (kg/hr)	Reaction (percent)	Advection (percent)
Air	1.22e-010	326	986	10.9	32.9
Water	7.36e-010	393	510	13.1	17
Soil	6.66e-009	785	0	26.2	0
Sediment	6.5e-010	0.547	0.0568	0.0182	0.00189

Persistence Time: 544 hr

Reaction Time: 1.08e+003 hr
Advection Time: 1.09e+003 hr
Percent Reacted: 50.1
Percent Advected: 49.9

Half-Lives (hr), (based upon Biowin (Ultimate) and Aopwin):
Air: 209.7
Water: 900
Soil: 900
Sediment: 3600
Biowin estimate: 2.689 (weeks-months)

Advection Times (hr):
Air: 100
Water: 1000
Sediment: 5e+004

Source : Epona Associates, LLC
Test substance : Chem Name : Benzenesulfonyl isocyanate, 4-methyl-
Molecular Wt: 197.21
Reliability : (2) valid with restrictions
Flag : Critical study for SIDS endpoint
05.04.2004 (6)

3.5 BIODEGRADATION

Type : anaerobic
Inoculum : Pseudomonas sp. (Bacteria)
Contact time :
Degradation : (±) % after
Result : other: low biodegradability
Deg. product :
Method :
Year : 2001
GLP : no data
Test substance : other TS

Remark : PTSI reacts rapidly with excess water to form the corresponding carbamic acid, which in turn, undergoes immediate decomposition to form carbon dioxide and p-toluenesulfonamide (CAS number 70-55-3).

Result : A bacterium capable of utilising p-toluenesulphonamide was isolated from activated sludge. The isolated strain designated PTSA was identified as a Pseudomonas sp. using chemotaxonomic and genetic studies. Pseudomonas PTSA grew on p-toluenesulphonamide in a chemostat with approximately 90% release of sulphate and 80% release of ammonium. The isolate was also able to grow on 4-carboxybenzenesulphonamide and 3,4-dihydroxybenzoate but did not grow on p-toluenesulphonate. The transient appearance of 4-hydroxymethylbenzenesulphonamide and 4-carboxybenzenesulphonamide during p-toluenesulphonamide degradation proves oxidation of the methyl group is the initial attack in the biodegradation pathway. Both metabolites of p-toluenesulphonamide degradation were identified by high-performance liquid chromatography-mass spectrometry. 4-Carboxybenzenesulphonamide is probably converted into 3,4-dihydroxybenzoate and amidosulphurous acid.

The latter is a chemically unstable compound in aqueous solutions and immediately converted into sulphite and ammonium. Both sulphite and ammonium were formed during degradation of 4-carboxybenzenesulphonamide.

Source : Epona Associates, LLC

Test substance : CAS Registry Number: 70-55-3
Chemical Name: P-TOLUENESULFONAMIDE
Synonyms: 4-METHYLBENZENESULFONAMIDE
Molecular Formula: C7H9NO2S
Molecular Weight: 171.22

Reliability : (2) valid with restrictions

Flag : Critical study for SIDS endpoint

02.04.2004

(11)

4.1 ACUTE/PROLONGED TOXICITY TO FISH

Type	:	
Species	:	
Exposure period	:	96 hour(s)
Unit	:	mg/l
LC50	:	= 1314
LC50 (14-day)	:	= 2005
Method	:	other: estimated
Year	:	2004
GLP	:	no
Test substance	:	other TS
Remark	:	PTSI reacts rapidly with excess water to form the corresponding carbamic acid, which in turn, undergoes immediate decomposition to form carbon dioxide and p-toluenesulfonamide (CAS number 70-55-3). PTSI is not likely to be found in the environment.
Result	:	ECOSAR v0.99g Class(es) Found --- Neutral Organics

ECOSAR Class	Organism	Duration	Predicted End Pt	mg/L (ppm)
Neutral Organic SAR: Fish (Baseline Toxicity)		14-day	LC50	2005.498
Neutral Organics: Fish		96-hr	LC50	1314.445

Source	:	Epona Associates, LLC
Test condition	:	MOL FOR: C7 H9 N1 O2 S1 MOL WT : 171.22 Log Kow: 0.92 (KowWin estimate) Melt Pt: Wat Sol: 9619 mg/L (calculated)
Test substance	:	SMILES : O=S(=O)(N)c(ccc(c1)C)c1 CHEM : Benzenesulfonamide, 4-methyl-
Reliability	:	(2) valid with restrictions
Flag	:	Critical study for SIDS endpoint

05.04.2004 (3)

Type	:	flow through
Species	:	Oncorhynchus mykiss (Fish, fresh water)
Exposure period	:	60 day(s)
Unit	:	mg/l
Effect Conc	:	= 9
Method	:	other
Year	:	1996
GLP	:	no data
Test substance	:	other TS
Remark	:	PTSI reacts rapidly with excess water to form the corresponding carbamic acid, which in turn, undergoes immediate decomposition to form carbon dioxide and p-toluenesulfonamide (CAS number 70-55-3). PTSI is not likely to be found in the environment.
Result	:	Effect Endpoint Type: Effect Code (EFF) : GPHY - physiology, general Trend (TREND) : CHG - change Effect Category (EFFCAT): PHY - physiological: change in the organic processes or functions of an organism

Effect Tissue (TISSUE): BL - blood

Source : Epona Associates, LLC

Test condition : Age/Life Stage: ADULT, 206.5-670.7 G (grams)
Exposure Regimen: 60 (test duration); NR - not reported (minimum duration);
NR - not reported (maximum duration); Units: Ml - minutes
Controls: M - multiple types of controls were reported by the author

Test substance : CAS Registry Number: 70-55-3
Chemical Name: P-TOLUENESULFONAMIDE
Synonyms: 4-METHYLBENZENESULFONAMIDE
Molecular Formula: C7H9NO2S
Molecular Weight: 171.22

Reliability : (2) valid with restrictions
05.04.2004 (8)

4.2 ACUTE TOXICITY TO AQUATIC INVERTEBRATES

Type : other

Species : other: Daphnia

Exposure period :

Unit :

Method : other: estimated

Year : 2004

GLP : no

Test substance : other TS

Remark : PTSI reacts rapidly with excess water to form the corresponding carbamic acid, which in turn, undergoes immediate decomposition to form carbon dioxide and p-toluenesulfonamide (CAS number 70-55-3). PTSI is not likely to be found in the environment.

Result : ECOSAR v0.99g Class(es) Found

Neutral Organics

ECOSAR Class	Organism	Duration	End Pt	Predicted mg/L (ppm)
Neutral Organics	Daphnid	48-hr	LC50	1307.201
Neutral Organics	Daphnid	16-day	EC50	41.797

Source : Epona Associates, LLC

Test condition : MOL FOR: C7 H9 N1 O2 S1
MOL WT : 171.22
Log Kow: 0.92 (KowWin estimate)
Melt Pt:
Wat Sol: 9619 mg/L (calculated)

Test substance : SMILES : O=S(=O)(N)c(ccc(c1)C)c1
CHEM : Benzenesulfonamide, 4-methyl-

Reliability : (2) valid with restrictions

Flag : Critical study for SIDS endpoint
12.04.2004 (3)

4.3 TOXICITY TO AQUATIC PLANTS E.G. ALGAE

Species : other algae: Green algae

Endpoint	:	
Exposure period	:	96 hour(s)
Unit	:	mg/l
EC50	:	= 767
Method	:	other: estimated
Year	:	2004
GLP	:	no
Test substance	:	other TS
Remark	:	PTSI reacts rapidly with excess water to form the corresponding carbamic acid, which in turn, undergoes immediate decomposition to form carbon dioxide and p-toluenesulfonamide (CAS number 70-55-3). PTSI is not likely to be found in the environment.
Result	:	ECOSAR v0.99g Class(es) Found --- Neutral Organics

ECOSAR

Class	Organism	Duration	End Pt	mg/L (ppm)
Neutral Organics	Green Algae	96-hr	EC50	767.966
Neutral Organics	Green Algae	96-hr	ChV	41.140

Source	:	Epona Associates, LLC
Test condition	:	MOL FOR: C7 H9 N1 O2 S1 MOL WT : 171.22 Log Kow: 0.92 (KowWin estimate) Melt Pt: Wat Sol: 9619 mg/L (calculated)
Test substance	:	SMILES : O=S(=O)(N)c(ccc(c1)C)c1 CHEM : Benzenesulfonamide, 4-methyl-
Reliability	:	(2) valid with restrictions
Flag	:	Critical study for SIDS endpoint

12.04.2004 (3)

5.1.1 ACUTE ORAL TOXICITY

Type	:	LD50
Value	:	= 2600 mg/kg bw
Species	:	
Strain	:	
Sex	:	
Number of animals	:	
Vehicle	:	
Doses	:	
Method	:	
Year	:	2002
GLP	:	no data
Test substance	:	as prescribed by 1.1 - 1.4
Source	:	Epona Associates, LLC
Reliability	:	(2) valid with restrictions
Flag	:	Critical study for SIDS endpoint

09.06.2003 (13)

5.1.2 ACUTE INHALATION TOXICITY

5.1.3 ACUTE DERMAL TOXICITY

5.1.4 ACUTE TOXICITY, OTHER ROUTES

5.4 REPEATED DOSE TOXICITY

Type	:	Sub-acute
Species	:	rat
Sex	:	male/female
Strain	:	other: Crj:CD(SD)
Route of admin.	:	gavage
Exposure period	:	42 d prior to mating (M) or 14 d before mating through d 3 lactation (F)
Frequency of treatm.	:	daily
Post exposure period	:	
Doses	:	0, 120, 300, and 750 mg/kg
Control group	:	yes
Method	:	other: OECD 422
Year	:	1994
GLP	:	yes
Test substance	:	other TS
Remark	:	PTSI reacts rapidly with excess water to form the corresponding carbamic acid, which in turn, undergoes immediate decomposition to form carbon dioxide and p-toluenesulfonamide (CAS number 70-55-3).
Result	:	Dose-related hypersalivation was observed in all treatment groups. Significant decrease in body weight gains in the high-dose M relative to controls persisted throughout the dosing period. Relative kidney and liver weights were slightly increased in high-dose animals. A dose-dependent increase in white blood cells counts was observed in mid- and high-dose M and some F (1 low-, 12 mid-, and 7 high-dose groups). An increased number

of neutrophils were observed in high-dose M. BUN, GOT, and chloride were
significantly elevated in the two highest dose groups (M). GPT levels were significantly elevated and potassium levels decreased in the high-dose M. Four animals from the high-dose groups displayed hematuria within the first 3 d of dosing. There was an involution of the thymus in 8 high- and middosed
F.

Test condition : Rat, Crj:CD(SD), adult, age n.p., 13 M and 13 F/dose Animals dosed orally (0,120, 300, and 750 mg/kg [0, 0.701, 1.75, and 4.38 mmol/kg]) for 42 d prior to mating (M) or 14 d before mating through d 3 lactation (F)
Test substance : p-TSA in 5% gum Arabic solution, >99.9% pure
Reliability : (1) valid without restriction
Flag : Critical study for SIDS endpoint
05.04.2004 (9)

5.5 GENETIC TOXICITY 'IN VITRO'

Type : Bacterial reverse mutation assay
System of testing : S. typhimurium strains TA98, TA100, TA1535, TA1537; Escherichia coli WP2 ultra violet radiation A
Test concentration : 0, 312.5, 625, 1250, 2500, 5000 µg/plate [1.825, 3.65, 7.300, 14.60, and 29.20 µmol/plate]
Cycotoxic concentr. : 5000 ug/plate
Metabolic activation : with and without
Result : negative
Method :
Year : 1994
GLP : yes
Test substance : other TS

Remark : PTSI reacts rapidly with excess water to form the corresponding carbamic acid, which in turn, undergoes immediate decomposition to form carbon dioxide and p-toluenesulfonamide (CAS number 70-55-3).
Result : Mutagenic effects were not observed under the test conditions. Minimum toxic concentration observed for bacteria was 5000 µg/plate [29.20 µmol/plate] with and without activation.
Source : Epona Associates, LLC
Test substance : p-TSA in DMSO
Reliability : (1) valid without restriction
Flag : Critical study for SIDS endpoint
05.04.2004 (9) (10)

Type : Chromosomal aberration test
System of testing : CHL cells
Test concentration : Without S9: 0, 0.33, 0.65, 1.30 mg/mL [0, 1.93, 3.80, 7.59 mM]; with S9: 0, 0.43, 0.85, 1.70 mg/mL [0, 2.5, 5.0, 9.9 mM].
Cycotoxic concentr. : >2.0 mg/mL [11.68 mM] with metabolic activation and 2.0 mg/mL [11.68 mM] without metabolic activation.
Metabolic activation : with and without
Result : negative
Method :
Year : 1994
GLP : yes
Test substance : other TS

Remark : PTSI reacts rapidly with excess water to form the corresponding carbamic

		acid, which in turn, undergoes immediate decomposition to form carbon dioxide and p-toluenesulfonamide (CAS number 70-55-3).
Result	:	The test material was classified as "negative" for chromosomal aberrations, under the test conditions. The lowest concentration producing cell toxicity was >2.0 mg/mL [11.68 mM] with metabolic activation and 2.0 mg/mL [11.68 mM] without metabolic activation.
Source	:	Epona Associates, LLC
Test condition	:	Without S9: 0, 0.33, 0.65, 1.30 mg/mL [0, 1.93, 3.80, 7.59 mM]; with S9: 0, 0.43, 0.85, 1.70 mg/mL [0, 2.5, 5.0, 9.9 mM].
Test substance	:	p-TSA in DMSO, purity 99.9%
Reliability	:	(1) valid without restriction
Flag	:	Critical study for SIDS endpoint

05.04.2004 (10)

5.6 GENETIC TOXICITY 'IN VIVO'

5.8.1 TOXICITY TO FERTILITY

Type	:	One generation study
Species	:	rat
Sex	:	male/female
Strain	:	other: Crj:CD(SD)
Route of admin.	:	gavage
Exposure period	:	42 d prior to mating (M) or 14 d before mating through d 3 lactation (F)
Frequency of treatm.	:	daily
Premating exposure period		
Male	:	42 days
Female	:	14 days
Duration of test	:	
No. of generation studies	:	
Doses	:	0, 120, 300, and 750 mg/kg
Control group	:	yes
NOAEL F1 offspring	:	= 300 mg/kg bw
Method	:	OECD Guide-line 422
Year	:	1994
GLP	:	yes
Test substance	:	other TS

Result	:	In the high-dose group, newborns showed significant decrease in body weight and survival rate. Two of the high-dose female rats showed signs of difficult labor; all their offspring died by d 3 of lactation. NOAEL for F1 generation was 300 mg/kg [1.75 mmol/kg] under the test conditions.
Source	:	Epona Associates, LLC
Test condition	:	Rat, Crj:CD(SD), adult, 13 M and 13 F/dose Animals dosed orally (0,120, 300, and 750 mg/kg [0, 0.701, 1.75, and 4.38 mmol/kg]) for 42 d prior to mating (M) or 14 d before mating through d 3 lactation (F)
Test substance	:	p-TSA (99.9% pure)
Reliability	:	(1) valid without restriction
Flag	:	Critical study for SIDS endpoint

05.04.2004 (9)

5.8.2 DEVELOPMENTAL TOXICITY/TERATOGENICITY

Species	:	rat
Sex	:	male/female
Strain	:	other: Crj:CD(SD)
Route of admin.	:	gavage
Exposure period	:	Animals dosed orally for 42 d prior to mating (M) or 14 d before mating through d 3 lactation (F)
Frequency of treatm.	:	daily
Duration of test	:	
Doses	:	0, 120, 300, and 750 mg/kg
Control group	:	yes
NOAEL teratogen.	:	= 300 - mg/kg bw
Method	:	other: OECD 422
Year	:	1994
GLP	:	yes
Test substance	:	other TS
Result	:	Morphological observations for offspring revealed no teratogenic effect of the test substance. NOAEL for F1 generation was 300 mg/kg [1.75 mmol/kg] under the test conditions.
Source	:	Epona Associates, LLC
Test condition	:	Rat, Crj:CD(SD), Maternal doses: 0, 120, 300, 750 mg/kg/d [0, 0.701, 1.75, and 4.38 mmol/kg/d]
Test substance	:	p-TSA (99.9% pure)
Reliability	:	(1) valid without restriction
Flag	:	Critical study for SIDS endpoint

05.04.2004 (9)

(1) Atmospheric Oxidation (25 deg C) [AopWin v1.90]

(3) ECOSAR Program (v0.99g)

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(5) HYDROWIN Program (v1.67)

(6) Level III Fugacity Model (Full-Output)

(7) Log Kow (WSKOW v1.40)

(8) POWELL, M.D.; S.F. PERRY (1996). Respiratory and Acid-Base Disturbances in Rainbow Trout (Oncorhynchus mykiss) Blood During Exposure to Chloramine T, paratoluenesulphonamide, and.. Canadian Journal of Fisheries and Aquatic Sciences, 53(4): 701-708; 1996; BiblioLine(c) 1997-2004, NISC International, Inc. All Rights Reserved.
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(9) Unpublished report on Combined Repeat Dose and Reproductive Developmental Toxicity Screening Test of (Specific chemical)- HPV/SIDS test conducted by MHW; cited by OECD (1994); EMEA (1999) citChloramine-T [127-65-1] and Metabolite p-Toluenesulfonamide [70-55-3]
Review of Toxicological Literature (2002) Prepared for
Scott Masten, Ph.D. National Institute of Environmental Health Sciences P.O. Box 12233 Research Triangle Park, North Carolina 27709 Contract No. N01-ES-65402
Submitted by Karen E. Haneke, M.S. Integrated Laboratory Systems P.O. Box 13501 Research Triangle Park, North Carolina 27709.

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(13) VanDeMark Inc., Material Data Safety Sheet, p-Toluenesufonyl Isocyanate. Doc: SE-0029-00 Rev. C 05/09/02.